

ERS

Endurance 3.000h at 105°C

Rated voltage range: 10V to 100V, Rated capacitance range: 3,3µF to 1000µF

Size range: 8,9 x 12,0mm and 10,2 x 12,0mm

Designed as G-Kap (C_R measured at DC-Load) or bipolar Chip capacitor available

RoHS compliant

Special types on request



Specifications

	Characteristics									
Temperature range	-55°C to +105°C									
Rated voltage range	10V to 100V									
Capacitance tolerance	±20%, other on request (at 20°C, 100Hz)									
Leakage current I_{ra}	$I_{ra}=0,002 \cdot C_R \cdot V_R + 3\mu A$ or $5\mu A$, whichever is greater (I_{ra} [µA], C_R : Rated capacitance [µF], V_R : Rated voltage [V]) (at 20°C, after 5 minutes)									
Dissipation factor $\tan \delta$ (D.F.)	Rated voltage (V_R)	10V	16V	25V	35V	40V	50V	63V	100V	(at 20°C, 100Hz)
	$\tan \delta_{max}$	0,19	0,16	0,14	0,12	0,11	0,10	0,09	0,08	
Low temperature characteristics Z_{max}-factor	Rated voltage (V_R)	10V	16V	25V	35V	40V	50V	63V	100V	(100Hz)
	Z(-40°C)/(20°C)	2	2	2	2	2	2	2	2	
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 3.000 hours at 105°C.									
	Capacitance change	$\Delta C/C0 \leq \pm 25\%$								
	D.F. ($\tan \delta$)	$\Delta \tan \delta \leq +200\%$ of the initial specification value								
	Leakage current (I_{ra})	$I_{ra} \leq$ the initial specified value								
Shelf life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1.000 hours at 105°C without voltage applied.									
	Capacitance change	$\Delta C/C0 \leq \pm 25\%$								
	D.F. ($\tan \delta$)	$\Delta \tan \delta \leq +200\%$ of the initial specification value								
	Leakage current (I_{ra})	$I_{ra} \leq +200\%$ of the initial specification value								
Surge voltage test	The capacitors shall be subjected to 1.000 cycles each consisting of charging with the specified surge voltage for 30±5 seconds through a protective resistor ($R=0,1/C_R$) and open-circuiting for 330 seconds at 105°C. The following specifications shall be satisfied when the capacitors are restored to 20°C.									
	Rated voltage (V_R)	10V	16V	25V	35V	40V	50V	63V	100V	
	Surge voltage (V_S)	11,5V	18,4V	28,8V	40,3V	46V	57,5V	72,5V	115V	
	Appearance	No significant damage								
	Capacitance change	$\Delta C/C0 \leq \pm 10\%$								
	D.F. ($\tan \delta$)	$\tan \delta \leq$ the initial specified value								
	Leakage current (I_{ra})	$I_{ra} \leq$ the initial specified value								

FROLYT

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ISO 9001

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Aluminum-electrolytic capacitors SMD (Chip) for surface mounting in the general industrial electronics and special electronics for example automobile industry. Insulated, polarized, pulse proof
Endurance at least 3.000h at +105°C

ERS

Generic specification:
DIN EN 60384-1

Sectional specification:
DIN EN 60384-18
without quality assessment

Operating temperature range:
- 55°C to +105°C

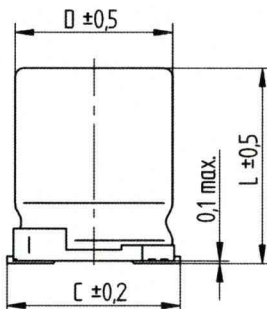
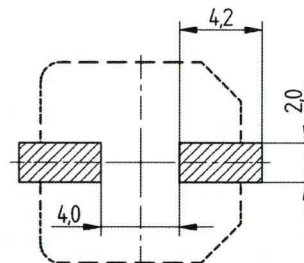
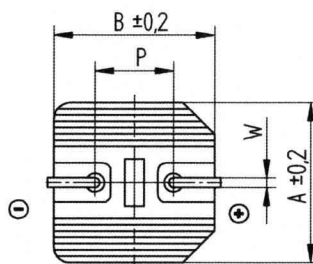
Climatic category:
55/105/56

Capacitance range:
±20% (other on request)

Surge voltage V_S :
 $V_S = 1,15 \cdot V_R$

Leakage current I_{ra} :
measured at V_R at +20°C
 $I_{ra} \leq 0,002 \cdot C_R \cdot V_R + 3\mu A$ or 5μA
(after 5 minutes, whichever is greater)
 C_R : Rated capacitance (μF)
 V_R : Rated voltage (V)

Reverse voltage:
at +20°C to +25°C = 2V (briefly)
at -55°C to +105°C = 1V (briefly)



*)Soldering on PC board



The marking is done by printing on the case surface (Ink-Jet)

*)Recommended Soldering area on PC board

Dimensions (mm)		
	Terminal length x Height	
	8,9 x 12,0	10,2 x 12,0
A	8,9	10,2
B	8,9	10,2
C	9,7	11,0
D	8,7	10,0
L	12,0	12,0
W	0,8-1,1	0,8-1,1
P	4,5	4,5

Endurance at least (after soldering)	
Ambient temperature	
≤ +40°C	288.000h
+85°C	12.000h
+105°C	3.000h

Dimensions Overview: Terminal length x Height (mm)								
Rated cap. C_R [μF]	Rated voltage V_R [V]							
	10	16	25	35	40	50	63	100
3,3								8,9 x 12,0
4,7								8,9 x 12,0
6,8								8,9 x 12,0
10					8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0
15				8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0
22			8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0
33		8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	10,2 x 12,0
47	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	10,2 x 12,0
68	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	10,2 x 12,0	
100	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	10,2 x 12,0	
150	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	10,2 x 12,0	10,2 x 12,0	10,2 x 12,0	
220	8,9 x 12,0	8,9 x 12,0	8,9 x 12,0	10,2 x 12,0	10,2 x 12,0	10,2 x 12,0		
330	8,9 x 12,0	10,2 x 12,0	10,2 x 12,0	10,2 x 12,0				
470	8,9 x 12,0	10,2 x 12,0	10,2 x 12,0					
680	8,9 x 12,0	10,2 x 12,0						
1 000	10,2 x 12,0							

Technical specifications

Rated cap. C_R [μ F]	Rated voltage V_R [V]	Size [mm] Terminal length x Height	$\tan \delta$ 100Hz +20°C (max)	ESR [Ω] 100Hz +20°C (max)	Z [Ω] 10kHz +20°C (max)	Z [Ω] 10kHz -40°C (max)	I~ [mA]* 100kHz +105°C (max)	Ordering information for FROLYT SMD/Chip electrolytic capacitors
47	10	8,9 x 12,0	0,19	6,43	1,35	14,90	150	<ul style="list-style-type: none"> • Series • Rated capacitance/ Rated voltage • Capacitance tolerance • Dimensions (Terminal length x Height) • Additional requirements
68	10	8,9 x 12,0	0,19	4,45	0,90	9,90	183	
100	10	8,9 x 12,0	0,19	3,02	0,53	5,80	225	
150	10	8,9 x 12,0	0,19	2,02	0,53	5,80	273	
220	10	8,9 x 12,0	0,19	1,37	0,53	5,80	330	
330	10	8,9 x 12,0	0,19	0,92	0,53	5,80	400	
470	10	8,9 x 12,0	0,19	0,64	0,53	5,80	480	
680	10	8,9 x 12,0	0,19	0,44	0,47	5,20	533	
1 000	10	10,2 x 12,0	0,19	0,30	0,43	4,50	601	
33	16	8,9 x 12,0	0,16	7,72	1,38	15,20	150	
47	16	8,9 x 12,0	0,16	5,42	1,05	11,60	170	
68	16	8,9 x 12,0	0,16	3,74	0,80	8,80	230	
100	16	8,9 x 12,0	0,16	2,55	0,53	5,80	260	
150	16	8,9 x 12,0	0,16	1,70	0,53	5,80	300	
220	16	8,9 x 12,0	0,16	1,16	0,53	5,80	370	
330	16	10,2 x 12,0	0,16	0,77	0,42	4,40	470	
470	16	10,2 x 12,0	0,16	0,54	0,42	4,40	560	
680	16	10,2 x 12,0	0,16	0,37	0,39	4,30	620	
22	25	8,9 x 12,0	0,14	10,13	1,30	14,30	150	
33	25	8,9 x 12,0	0,14	6,75	1,10	12,10	170	
47	25	8,9 x 12,0	0,14	4,74	0,90	9,90	210	
68	25	8,9 x 12,0	0,14	3,28	0,70	7,70	240	
100	25	8,9 x 12,0	0,14	2,23	0,53	5,80	280	
150	25	8,9 x 12,0	0,14	1,49	0,53	5,80	350	
220	25	8,9 x 12,0	0,14	1,01	0,53	5,80	400	
330	25	10,2 x 12,0	0,14	0,68	0,42	4,40	510	
470	25	10,2 x 12,0	0,14	0,47	0,39	4,30	600	
15	35	8,9 x 12,0	0,12	12,73	1,36	15,00	150	
22	35	8,9 x 12,0	0,12	8,68	1,15	12,70	170	
33	35	8,9 x 12,0	0,12	5,79	1,05	11,60	195	
47	35	8,9 x 12,0	0,12	4,06	0,80	8,80	215	
68	35	8,9 x 12,0	0,12	2,81	0,65	7,20	285	
100	35	8,9 x 12,0	0,12	1,91	0,60	6,60	300	
150	35	8,9 x 12,0	0,12	1,27	0,50	5,50	365	
220	35	10,2 x 12,0	0,12	0,87	0,42	4,40	450	
330	35	10,2 x 12,0	0,12	0,58	0,36	4,00	540	
10	40	8,9 x 12,0	0,11	17,51	1,94	21,34	150	
15	40	8,9 x 12,0	0,11	11,67	1,49	16,39	170	
22	40	8,9 x 12,0	0,11	7,96	1,05	11,55	190	
33	40	8,9 x 12,0	0,11	5,31	0,83	9,13	205	
47	40	8,9 x 12,0	0,11	3,72	0,60	6,60	220	
68	40	8,9 x 12,0	0,11	2,57	0,60	6,60	290	
100	40	8,9 x 12,0	0,11	1,75	0,60	6,60	300	
150	40	10,2 x 12,0	0,11	1,17	0,46	5,06	380	
220	40	10,2 x 12,0	0,11	0,80	0,31	3,41	460	
6,8	50	8,9 x 12,0	0,10	23,41	2,05	22,55	150	
10	50	8,9 x 12,0	0,10	15,92	1,81	19,91	170	
15	50	8,9 x 12,0	0,10	10,61	1,26	13,86	180	
22	50	8,9 x 12,0	0,10	7,23	0,94	10,34	200	
33	50	8,9 x 12,0	0,10	4,82	0,92	10,12	215	
47	50	8,9 x 12,0	0,10	3,39	0,90	9,90	230	
68	50	8,9 x 12,0	0,10	2,34	0,85	9,35	315	
100	50	8,9 x 12,0	0,10	1,59	0,80	9,90	350	
150	50	10,2 x 12,0	0,10	1,06	0,42	4,62	450	
220	50	10,2 x 12,0	0,10	0,72	0,29	3,19	525	

Ordering example: ERS 470 μ F 16V \pm 20%, 10,2 x 12,0mm, Carrier Tape on reel

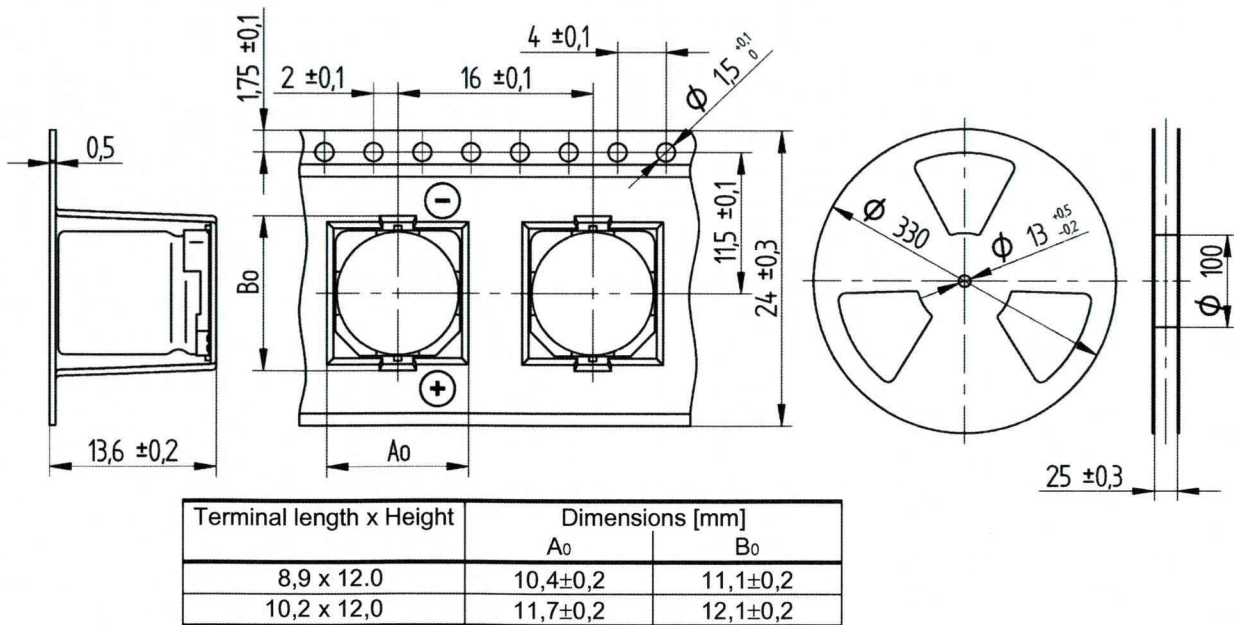
* I~ (Rated ripple current) refers to an increase in temperature of 3K, special requirements or special types on request

Technical specifications

Rated cap. C_R [μF]	Rated voltage V_R [V]	Size [mm]		$\tan \delta$ 100Hz +20°C (max)	ESR [Ω] 100Hz +20°C (max)	Z [Ω] 10kHz +20°C (max)	Z [Ω] 10kHz -40°C (max)	I_{\sim} [mA]* 100kHz +105°C (max)	Ordering information for FROLYT SMD/Chip electrolytic capacitors
		Terminal length	Height						
4,7	63	8,9 x 12,0		0,09	30,48	4,50	50,40	150	Series Rated capacitance/ Rated voltage Capacitance tolerance Dimensions (Terminal length x Height) Additional requirements Ordering example: ERS 470 μF 16V $\pm 20\%$, 10,2 x 12,0mm, Carrier Tape on reel
6,8	63	8,9 x 12,0		0,09	21,06	3,50	39,20	170	
10	63	8,9 x 12,0		0,09	14,32	2,50	28,00	180	
15	63	8,9 x 12,0		0,09	9,55	1,20	13,20	185	
22	63	8,9 x 12,0		0,09	6,51	1,10	12,00	205	
33	63	8,9 x 12,0		0,09	4,34	1,00	11,00	220	
47	63	8,9 x 12,0		0,09	3,05	0,90	10,00	290	
68	63	10,2 x 12,0		0,09	2,11	0,85	9,35	340	
100	63	10,2 x 12,0		0,09	1,43	0,80	8,80	370	
150	63	10,2 x 12,0		0,09	0,95	0,42	4,62	500	
3,3	100	8,9 x 12,0		0,08	38,58	9,00	297,00	150	
4,7	100	8,9 x 12,0		0,08	27,09	7,50	247,50	170	
6,8	100	8,9 x 12,0		0,08	18,72	5,00	165,00	175	
10	100	8,9 x 12,0		0,08	12,73	3,00	99,00	185	
15	100	8,9 x 12,0		0,08	8,49	2,50	82,50	190	
22	100	8,9 x 12,0		0,08	5,79	1,50	49,50	210	
33	100	10,2 x 12,0		0,08	3,86	1,20	39,50	230	
47	100	10,2 x 12,0		0,08	2,71	1,00	33,00	300	

* I_{\sim} (Rated ripple current) refers to an increase in temperature of 3K, special requirements or special types on request

- Packaging:
- Blister tapes on reel
 - 300 components/ reel (one packaging unit)
 - 2700 Chips = 9 reels (minimum order quantity)



Soldering:

Recommended soldering conditions: https://www.frolyt.de/wp-content/uploads/Soldering_profils.pdf.

FROLYT-SMD-capacitors the size 10,2 x 12,0 are also suitable für vapor phase soldering.

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